

WHAT IS CLAIMED IS:

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1. A method of continuously casting metals, comprising applying a non-moving, vibrating magnetic field to a molten metal in a casting mold to impose only vibration on the molten metal.

2. The method according to Claim 1, wherein said non-moving, vibrating magnetic field is produced by arranging electromagnets, each of which comprises an iron core and a coil wound over the iron core, in a facing relation on opposite sides of said mold along a transverse width thereof to lie side by side along a longitudinal width of said mold, and supplying a single-phase AC current to each coil.

3. The method according to Claim 1, wherein said iron core comprises individual single iron cores separate from each other, or a comb-shaped iron core having a comb-teeth portion over which coils are wound.

4. The method according to Claim 1, wherein said single-phase AC current has frequency of 0.10 to 60 Hz.

5. The method according to Claim 2, wherein said single-phase AC current has frequency of 0.10 to 60 Hz.

6. The method according to Claim 3, wherein said single-phase AC

current has frequency of 0.10 to 60 Hz.

7. An apparatus for continuous casting of molten metals, the molten metal being continuously cast using a casting mold, said apparatus comprising:

means for applying a non-moving, vibrating magnetic field to the molten metal in said mold to impose only vibration on the molten metal;

electromagnets each comprising an iron core and a coil wound over said iron core, said electromagnets being arranged in a facing relation on opposite sides of said mold along a transverse width thereof to lie side by side along a longitudinal width of said mold; and

means for supplying a single-phase AC current of 0.10 to 60 Hz to each coil.

8. The apparatus according to Claim 7, wherein said iron core comprises individual single iron cores separate from each other, or a comb-shaped iron core having a comb-teeth portion over which the coils are wound.

9. The method according to Claim 1, wherein a DC magnetic field and an AC magnetic field for producing said non-moving, vibrating magnetic field are applied in superimposed fashion along a transverse width of said mold.

10. The method according to Claim 9, wherein the superimposed

magnetic field is applied from at least one pair of magnetic poles arranged to face each other above or/and below an ejection port of an immersion nozzle.

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11. An apparatus for continuous casting of molten metals, the molten metal being continuously cast using a casting mold, said apparatus comprising:

a coil supplied with a DC current for producing a DC magnetic field and a coil supplied with an AC current for producing a non-moving, vibrating magnetic field, both said coils being wound over each of common iron cores, said iron cores being arranged around said mold such that a direction of the magnetic fields produced by said coils is aligned with a transverse width of said mold.

12. The apparatus according to Claim 11, wherein magnetic poles of said iron core are arranged in at least one pair to face each other above or/and below an ejection port of an immersion nozzle.

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13. A method for continuous casting of metals, comprising intermittently applying a static magnetic field in a thickness direction of a cast slab.

14. The method according to Claim 13, wherein said static magnetic field is intermittently applied under setting of an on-time $t_1 = 0.10$ to 30 seconds and an off-time $t_0 = 0.10$ to 30 seconds.

15. The method according to Claim 13, wherein said static magnetic field is applied to a surface of a molten metal.

16. The method according to Claim 14, wherein said static magnetic field is applied to a surface of a molten metal.

17. A method for continuous casting of metals, comprising the steps of:

applying a DC magnetic field and an AC magnetic field in superimposed fashion along a transverse width of a casting mold at positions above and below an ejection port of an immersion nozzle; and

moving said AC magnetic field in a longitudinally symmetrical relation from opposite ends to a center of said mold along a longitudinal width thereof.

18. An apparatus for continuous casting of molten metals, the molten metal being continuously cast using a casting mold, said apparatus comprising:

means for applying magnetic fields at positions above and below an ejection port of an immersion nozzle; and

a first coil for producing an AC magnetic field moving in a longitudinally symmetrical relation from opposite ends to a center of said mold along a longitudinal width thereof, and a second coil for producing a DC magnetic field, both said first and second coils being wound over

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each of common iron cores,

said iron cores being arranged on opposite sides of said mold along a transverse width thereof such that a direction of the magnetic fields produced by said coils is aligned with the transverse width of said mold.

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